

AGALINIS FLEXICAULIS SP. NOV. (OROBANCHACEAE: LAMIALES),  
A NEW SPECIES FROM NORTHEAST FLORIDA

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ABSTRACT

**Agalinis flexicaulis** Hays, sp. nov., is described from collections in Bradford County, northeast Florida. This new species is found in hydric to mesic soils of wiregrass communities or remnants thereof. A key to the long-pedicel species of *Agalinis* in Florida is provided to help distinguish *A. flexicaulis* from other species.

RESUMEN

**Agalinis flexicaulis** Hays, sp. nov., se describe de las colecciones del Condado de Bradford, en el noreste de Florida. Esta nueva especie se encuentra en los suelos húmedos de las comunidades de Wiregrass. Se aporta una clave para las especies de pedicelos largos de *Agalinis* en Florida para distinguir *A. flexicaulis* de otras especies de *Agalinis*.

Field work in preparation for the author's forthcoming treatment of *Agalinis* Raf. in volume 17 of the *Flora of North America*, in collaboration with Judith Canne-Hilliker of the University of Guelph, Ontario, has resulted in the discovery of an unknown species of *Agalinis*.

**Agalinis flexicaulis** Hays, sp. nov. (**Fig 1**). TYPE: UNITED STATES. FLORIDA. Bradford Co.: HY100, E side of road, 2.7 mi SSE from the town of Starke, ca. 29°54'21.07"N, 82° 5'26.16"W, in remnant prairie vegetation dominated by *Aristida longespica*, *A. stricta*, and *Andropogon virginicus*, 14 Oct 2009, J. Hays 3452 (HOLOTYPE: NY; ISOTYPES: BRIT, MO, OAC).

*Agalini obtusifoliae* similis sed differt caulibus longis laxis paniculis distantibus, corollis minoribus roseis, et ad apicem capsulae oblonga nervis insigniter prominentibus.

**Annual, hemiparasitic herb**, roots fibrous, haustoria present, host plant(s) unknown, 2.5–9.0 dm tall, often tinged purplish along upper surfaces of stem faces, remaining greenish when promptly pressed, turning purplish-maroon if allowed to air dry. **Stems** spreading-ascending, single from the base, the lower branches on larger plants decumbent-ascending, to 6 dm. Stem sub-terete below, becoming strongly four-angled above, stem faces glabrous, callous angles glabrous to minutely scabridulous, rounded, trichomes antrorse, but both perpendicular and retrorse trichomes occasionally present. **Leaves** opposite, often sub-opposite or alternate on ultimate branches, spreading to spreading-ascending above. **Axillary fascicles** absent. The leaves at mid-stem 7–13 mm long, linear to linear-spatulate (the lowermost leaves sometimes narrowly elliptic), 0.8–1.5 mm wide, stiff but fleshy, u-shaped in cross section, the upper surface slightly concave when fresh, becoming involute or folded upon drying, tips obtuse to acutish, silicified. *Upper surfaces* of leaves and margins scabrous with silicified trichomes, noticeably so upon drying, *lower surfaces* glabrous save some trichomes on midveins. **Inflorescence** indeterminate, paniculate-racemose, racemes and panicles remote, panicles sometimes as much as 5 dm removed from the main stem on larger plants. Flowering branches with 3 to 8 floriferous nodes, ultimate flowers solitary, not paired (though often appearing as such). **Pedicels** slender, clavate, terete, spreading, glabrous, often two-toned, purplish-maroon above and green below, 4–12 mm at anthesis, to 20(±22) mm in fruit, lowermost pedicels of raceme decidedly longer than those above in flower and fruit. The pedicel indistinct from base of calyx in flower. Bracts of ultimate, fully-developed flowers 0.5–4 mm long, linear-spathulate, ascending-appressed with the pedicel. **Calyx at anthesis** long campanulate to campanulate-turbinate, glabrous, tube 2.2–2.7 mm long, often two-toned, upper surface purplish-maroon, lower surface green; lobes 5, minute, acute, deltoid to subulate, 0.2–0.5 mm long, pu-



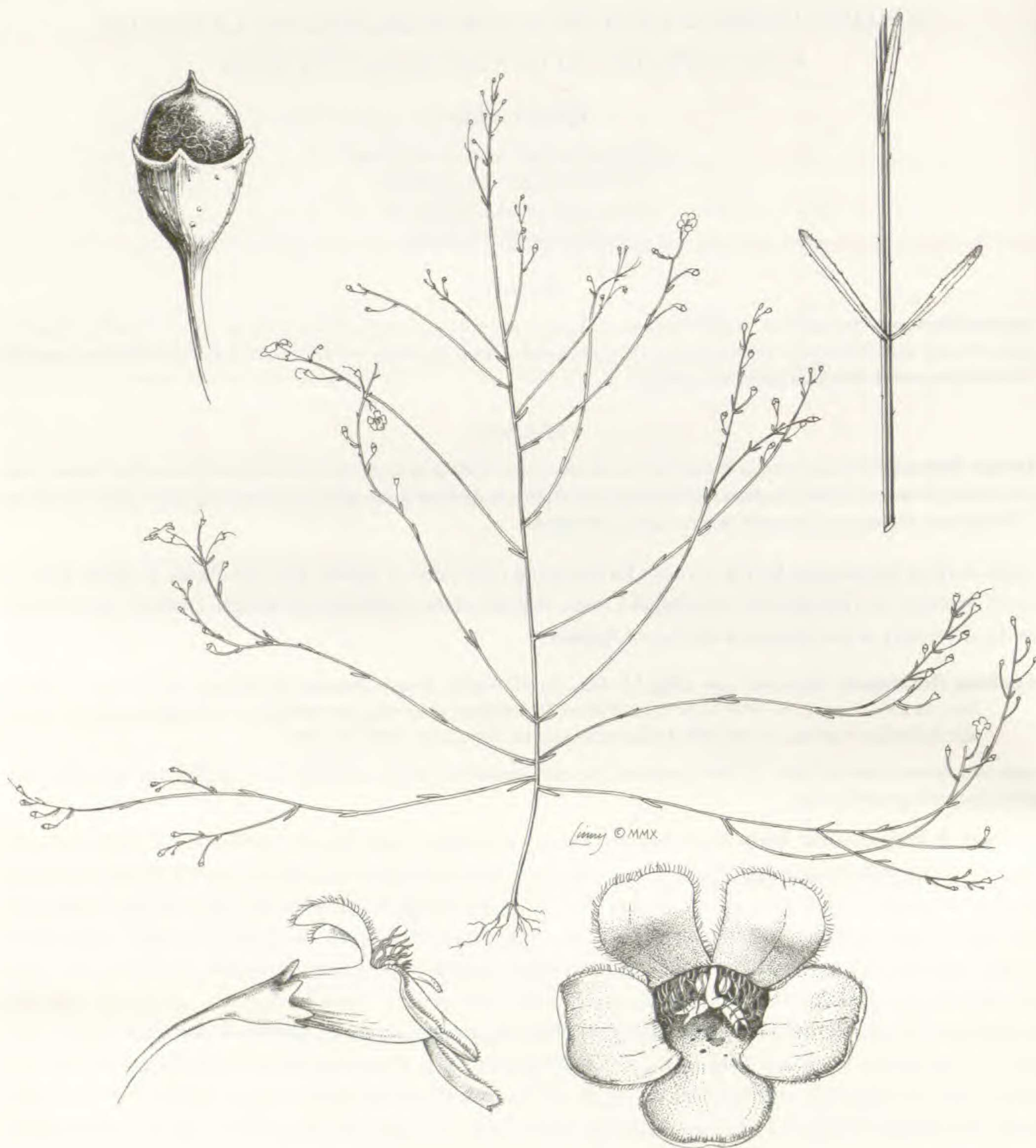


FIG. 1. *Agalinis flexicaulis*. A. Habit. B. Corolla, side view. C. Corolla, front view. D. Mature capsule. E. Partial cross-section of stem. Illustration by Linny Heagy©2010.

berulent within with silicified trichomes, callous-silicified, most evident upon drying, sinuses v-shaped to broadly rounded. **Calyx in fruit** oblong to hemispherical, 2.4–3.4 mm long, reticulate venation conspicuous and raised, small protuberances often present, sometimes minute, erect, silica-filled trichomes arising from calyx surface, some calyces splitting vertically on one side as fruit matures, lobes recurved, sinuses broadly concave to truncate. **Corolla** zygomorphic, as measured from base of tube to apices of upper two lobes, 10–12 mm long, rose-purple, the throat paler than the 5 lobes, some corollas with a few rose-purple spots abaxially within, yellow guidelines absent; *tube* 1.5–2.0 mm long, white, *abaxial throat*  $\pm 6$  mm long, *adaxial throat*  $\pm 4.5$  mm long, throat narrow, upcurved, soft-pubescent externally, otherwise glabrous. **Co-**



**rolla lobes** spreading, shorter than tube, surface of all lobes glabrous externally and internally above the sinuses. *The two upper lobes* 3–4 mm long,  $\pm 3$  mm wide, apex truncate, emarginate, or sometimes erose-cordate, strongly pink-ciliate, often reflexed above the middle of the lobes, lanose across the base of lobes with pink trichomes to 1.2 mm long. *The three lower lobes* 4–5 mm long, 2.5–3.0 mm wide, apex truncate, emarginate, or sometimes erose-cordate, ciliate, the central lobe with shorter cilia. **Stamens** didynamous, abaxial filaments 3.9–4.2 mm long, pubescent basally, adaxial filaments 2.4–3.0 mm long, glabrous. **Anthers** 4, apices rounded, bases mucronate to apiculate, white when fresh, valvular surfaces lanose, abaxial anthers elliptic, held mostly perpendicular to the filaments, apices often connivent by a dense entanglement of trichomes 1.2–1.8 mm long, adaxial anthers linear-oblong, held parallel to filaments, 1.5–2.0 mm long. **Style** 5–7 mm long, exsert, glabrous, white-translucent, *stigma*  $\pm 1$  mm long, white, papillate. **Capsule** long obovoid to oblongish, broadly 4-sided,  $\pm$  as wide as broad, 3.8–4.5 mm long at maturity, apex golden brown when mature, greenish-tan beneath calyx tube, apex truncate, appearing broad-shouldered along margins of callous ridge, base broadly cuneate, conspicuously-reticulate veined on the upper one-third of mature capsules, with scattered, minute, silica-filled trichomes often on surface of the capsule above the adhering calyx; callous ridge on capsule perpendicular to the septa, extending from the apex transversely downward to the base along opposite sides. **Seeds** triangular to quadrangular, lustrous golden-brown, minute,  $\pm 0.5$  mm long, testa reticulate. **Chromosome number** unknown.

Flowering from late September through early November, fruiting into late November. Occurring in mesic to hydric prairies or longleaf pine savannas dominated by wiregrass (*Aristida* spp.) and the remnants of such communities (Table 1). Currently known only from five populations in southern Bradford County, Florida. Apparently endemic. It is, however, to be expected in the following portions of adjacent counties: the northern one-third of Alachua County, SW Clay County, NW Putnam County, and the southern half of Union County.

Additional collections examined: **FLORIDA, all Bradford County:** Type locality, 17 Oct 2009, Hays 3453 (FLAS, USF); CR 18, 2.1 mi W of jct. of CR18 & SR100 on south side of road in remnant moist prairie/savanna, ca. 29°51'9.30"N, 82°5'57.04"W, 35 + plants in flower and early fruit, 17 Oct 2009, Hays 3454 (PH); CR225, 2.9 mi ESE from jct. of CR 225 and HY 301, ca. 29°52'43.03"N, 82°11'7.03"W, 40 + plants in flower and early fruit on S side of road in longleaf pine savanna, 24 Oct 2009, Hays 3455 (BRIT, MO, USF); CR 221, 0.3 mi S of jct. of HY301 and CR221, ca. 29°53'12.98"N, 82°8'17.06"W, 50 + plants in late flower and fruit along margin of regenerating longleaf pine savanna, 31 Oct 2009, Hays 3456 (FLAS, MO); SR100 west, 7.6 mi W of jct. of SR100 & HY301, and 0.8 mi E of jct. of CR 235 and SR100, ca. 29°58'44.41"N, 82°14'0.13"W, 60 + plants in fruit in remnant prairie vegetation beside regenerating longleaf pine plantation, S side of road, 1 Nov 2009, Hays 3457 (BRIT, FLAS, MO, NY, USF).

**Common name.**—Hampton False Foxglove; Sprawling False Foxglove. The common names are taken from the small town around which most of the original collections were made, and the obvious decumbent, flexous habit of larger branches on mature specimens.

**Etymology.**—The specific epithet “flexicaulis” was chosen to aptly describe the sprawling, decumbent branches so characteristic of the secondary and tertiary branches of the larger specimens of this species.

*Agalinis flexicaulis* is yet another elusive, but distinctive species of North American *Agalinis* that seems to melt into its surrounding habitat (Hays 2002). This species is unique among North American members of the genus because of its weakly ascending main stem, which becomes more drooping and lax as it matures, as well as the remote panicles (Canne-Hilliker & Kampny 1991; Pennell 1929). The secondary stems (especially the lower ones) are often 4 dm or more long, decumbent-ascending as the larger branches often droop toward the ground in the middle and then slightly arch upward toward their tips, supported by surrounding vegetation (mostly grasses) to expose the flowering branches. As mature capsules develop, the main stem leans toward one side and the long secondary flowering branches are near, on the ground, or entangled within surrounding vegetation, which often grows over the branches as the season progresses. Latent flowers often appear to arise from the ground on severed stems. The plants often need to be pulled gently, branch by branch, from the vegetation supporting them to avoid breaking the stems or losing leaves, flowers, or fruit. It is also common to see plants with decidedly secund branching, although not exclusively so.

Bradford County is part of the Northern Highlands physiographic province, with much of the county



TABLE 1. List of taxa associated with *Agalinis flexicaulis*.

Associate Species	State of Florida Wetland Status	Associate Species	State of Florida Wetland Status
<i>Aletris lutea</i>	FAC	<i>Kalmia hirsuta</i>	UPL
<i>Amphicarpum muhlenbergianum</i>	FACW	<i>Lachnocaulon anceps</i>	FACW
<i>Andropogon virginicus</i>	FAC	<i>Liatris spicata</i>	FAC
<i>Aristida longespica</i>	UPL	<i>Ludwigia hirtella</i>	FACW
<i>Aristida stricta</i>	FAC	<i>Mitreola sessilifolia</i>	FACW
<i>Bulbostylis stenophylla</i>	UPL	<i>Panicum longifolium</i>	FACW
<i>Carphephorus paniculatus</i>	FACW	<i>Panicum verrucosum</i>	FACW
<i>Centella asiatica</i>	FACW	<i>Pinus palustris</i>	UPL
<i>Chaptalia tomentosa</i>	FACW	<i>Pluchea baccharis</i>	FACW
<i>Dichanthelium acuminatum</i>	UPL	<i>Polygala lutea</i>	FACW
<i>Dichanthelium aciculare</i>	FACW	<i>Polygala setacea</i>	FACW
<i>Dichanthelium scoparium</i>	FACW	<i>Rhexia cubensis</i>	FACW
<i>Drosera capillaris</i>	FACW	<i>Rhexia petiolata</i>	FACW
<i>Eragrostis spectabilis</i>	FAC	<i>Sabatia brevifolia</i>	FACW
<i>Eragrostis elliottii</i>	FAC	<i>Scleria reticularis</i>	FACW
<i>Euthamia minor</i>	FAC	<i>Symeria cassiodes</i>	FAC
<i>Eryngium yuccifolium</i>	FAC	<i>Symphyotrichum adnatum</i>	UPL
<i>Gratiola hispida</i>	FAC	<i>Symphyotrichum dumosum</i>	FAC
<i>Helianthus radula</i>	UPL	<i>Vaccinium myrsinites</i>	UPL
<i>Hypericum tetrapetalum</i>	FACW	<i>Xyris caroliniana</i>	FACW
<i>Hyptis alata</i>	FACW	<i>Xyris floridana</i>	OBL
<i>Ilex glabra</i>	UPL		

having geologic and topographic characteristics of a large basin (Randazzo & Jones 1997; Dearstyne et al. 1991). The author visited approximately 100 potential sites in Bradford and adjacent counties in October and November of 2009. The following counties were visited: Baker to the north, Clay to the east, Alachua to the south, and Union to the west. Numerous habitat types were visited in an attempt to assess where this new species is most likely to occur: longleaf pine savannas, wet and dry prairies, seepage slopes, Florida scrub, pine flatwoods and high pine, and open, ruderal areas where native vegetation still exists in patches (Myers & Ewel 1990). *Agalinis flexicaulis* does not seem to tolerate the xeric conditions of other species of *Agalinis* in the area, such as *A. divaricata*, *A. filifolia*, *A. laxa*, and *A. plukenetii*. The author encountered all of these species on several occasions and found no *A. flexicaulis* co-occurring with them. Although *A. flexicaulis* can tolerate drier soils, it demonstrates an affinity for hydric soils, as indicated by the most common associates found growing with it (Table 1). This list is by no means comprehensive, but provides an indicator of commonly encountered species of a hydric (but not saturated), wiregrass-dominated ecotone in northeast Florida. The following wetland status for species found in Gilbert, Tobe, Cantrell, Sweeley, et al. (1995) is utilized: UPL for upland-listed species, FAC for a facultative-listed species, FACW for facultative-wet species, and OBL for obligate-wet plant species.

*Agalinis flexicaulis* is almost certainly a denizen of moist ecotones in wiregrass-dominated areas: savannas, prairies, seepage slopes, depressional wetlands, or along the upper margins of bogs. More surveys need to be conducted for this new species to form a baseline for its range and target habitat. Unfortunately, most of the wiregrass prairie and longleaf pine savannas in this area (and throughout their range for that matter) are now developed or are in longleaf pine plantations. As long as longleaf pine plantations occur, however, this species should persist if ecologically sound forestry practices are incorporated within management plans, and a “No Mowing” zone were to be implemented by various departments of transportation where the species is known to occur in Bradford County.

In addition, staff of herbaria with Florida holdings of *Agalinis* from Bradford and surrounding counties should re-examine their holdings. This, along with further fieldwork, will allow an assessment of the



rarity of *A. flexicaulis*. The author has studied *Agalinis* for over 12 years in Florida alone and was more than surprised at his “discovery” within a well known botanical area less than 20 miles from the University of Florida in Gainesville. This emphasizes not only the need for an additional survey for *Agalinis flexicaulis*, but underscores the fact that there are additional plant species to be described within the remaining intricate natural communities found in Florida.

Below is a key to the long-pediceled species of *Agalinis* to aid in identification.

KEY TO THE LONG-PEDICELED SPECIES OF AGALINIS IN NORTHEAST FLORIDA

- 1. Leaves alternate, reddish-purple, strongly fascicled and appearing whorled, succulent; plants of xeric habitats \_\_\_\_\_ **A. filifolia**
- 1. Leaves opposite (sometimes sub-opposite on the flowering branches), green to stramineous, fascicles absent or rarely developed; plants of various habitats.
  - 2. Plants perennial from a slender root stock, up 1.5 m tall; stems glabrous, often leaning; leaves and pedicels strongly ascending; plants of saturated or inundated soils; dried plants turning black \_\_\_\_\_ **A. linifolia**
  - 2. Plants annual, roots fibrous; the stems less than 1 m tall; leaves and pedicels various; plants of xeric to wet soils (but not in permanent bodies of water); plants drying stramineous to dark green, but not drying black.
    - 3. Stems strongly 4-angled, winged along principal stems; leaves linear to linear-spatulate, 0.6–2.5 cm long, 0.5–1.5 mm wide.
      - 4. Main stem erect, the branches stiffly ascending, puberulent to scabrous throughout; stems stramineous, drying the same; leaves 1–2.5 cm long, 0.5–1.5 mm wide, erect-ascending; corolla 12–17 mm long, pink, with two yellow guidelines present (sometimes faint), with purple spots in the throat; capsule globose, rounded at summit, surface smooth at apex \_\_\_\_\_ **A. obtusifolia**
      - 4. Main stem weakly ascending, glabrous-puberulent, the lowermost branches long-decumbent, laying upon or growing within surrounding vegetation, the secondary branches up to 5 dm in length; stems green, suffused with purplish-maroon, drying green to purplish-green; leaves 0.7–1.3 cm long, 0.8 to 1.4 mm wide, spreading; corolla 8–11 mm long, rose-purple, yellow guidelines absent, occasionally with purplish spots in the throat; capsule obovoid to oblong, the apex truncate at summit, with distinctively raised veins on the calyx and capsule, giving the appearance of small tubercles \_\_\_\_\_ **A. flexicaulis**
    - 3. Stems sub-terete to striate-angled, not clearly 4-angled; leaves filiform, linear, or narrowly lanceolate, 0.6–3.5 cm long, 0.5–3.5 mm wide.
      - 5. Two upper lobes of the corolla flattened or arched over the stamens; corolla glabrous within; pedicels 10–30 mm long at anthesis, at least some of the pedicels abruptly upturned at the apex, even more noticeable when dried.
        - 6. Leaves ascending-spreading, 1–4 mm wide, linear to narrowly lanceolate; two upper lobes of the corolla arching over the stamens, about equaling the lower lobes in length; corolla glabrous externally; bracts approaching or equaling pedicels in length; plants erect, often profusely branched, appearing bushy, to 8 dm tall \_\_\_\_\_ **A. tenuifolia**
        - 6. Leaves widely spreading, horizontal to the stem, or slightly reflexed at mid-stem, filiform, 0.5–1.0 mm wide; two upper lobes of the corolla flattened over the stamens, half as long as the three lower lobes; bracts much shorter than pedicels; plants sprawling, widely branched, rarely over 3 dm tall \_\_\_\_\_ **A. divaricata**
      - 5. Two upper lobes of the corolla reflexed; corolla pubescent within across the bases of the two upper lobes; pedicels 3–30 mm long at anthesis, not abruptly upturned at the apex.
        - 7. Corolla 14–18 mm long, pedicels on well-developed flowering branches 20–40 mm long, slender, pedicels 3–4 times as long as the subtending bracts \_\_\_\_\_ **A. laxa**
        - 7. Corolla 20–30 mm long, pedicels on well-developed flowering branches 4–12 mm long, pedicels stout, equaling or (usually) shorter than subtending bracts \_\_\_\_\_ **A. plukenetii**

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